PM-ISE Workshop for Information Sharing and Safeguarding Standards (WIS^3)

Appendix A – Breakout Track 1

Supporting Standardized Information Exchanges Across Government – Detailed Write-up

Panelists

Name	Organization	Role / Presentation
Laura Thibideaux	ACT-IAC	Moderator
Anthony Hoang	NIEM PMO	NIEM [Today and Tomorrow]
Robert Morrison	Royal Canadian Mounted Police (RCMP)	International Adoption of NIEM
Mark Reichardt	Open Geospatial Consortium (OGC)	Standards for Information Sharing: A Location Perspective
Peter W. Attas	FGM, Inc. for DISA PEO-GES	DoD Discovery Metadata Specification (DDMS)
Jonathan D. Addelston	ACT-IAC	Panel Facilitation / Scribe

Editorial Note: The following presentation summaries quote and paraphrase from the presentation materials. Quotation marks are used to emphasize specific definitions and key phrasing of statements provided in those presentations.

- Near Term Actions --- Continue to make progress on the following with increased community participation, accelerating where practical:
  - NIEM 3.0
  - UCORE convergence
  - NIEM UML
- Long Term Actions:
  - Evolve NIEM Governance
  - Understand user perspective and need to understand

Summary of Presentation by Anthony Hoang

This presentation provided a stimulating context for the breakout session discussions. A key observation was that the scale of a problem is a key driver for the applicability and adoption of NIEM as evidenced in the context of NIEM's impact on pharmaceutical monitoring.

The NIEM Framework includes the Community, a Technical Framework, and a Support Framework. NIEM is used to standardize data moving across systems, with emphasis on legacy systems. It intentionally does not address standardizing data within any given legacy system. Applying NIEM includes using a Common (Data) Language and a Repeatable and Usable Process for the Information Exchange Package Documentation (IEPDs).

The current NIEM focus areas, including community collaboration, are:

- Increasing NIEM's international adoption

- Broadening state and local government implementation of NIEM
- Developing enabling standards for NIEM and the Information Sharing Environment
- On-boarding new and strengthening existing NIEM domains (topic areas)
- Expanding governance to support other federal, state, local, and international agencies

The NIEM future focus areas are:

- Next major release, NIEM 3.0
- NIEM Mobile
- NIEM vendor enablement and tools strategy, including NIEM UML

This presentation concluded with a call for increasing community participation and adoption of NIEM.

Summary of Presentation by Robert Morrison

The speaker has experience with international intelligence sharing in the Middle East. He works for the CIO of Canada. NIEM is being adopted by Canada across domains but is in the early stages of implementation. NIEM meets most of Canada's requirements, but needs to be extendible to accommodate differences in Canadian information than that already addressed by NIEM. NIEM is a mature data model. There is a groundswell of adoption in Canada.

Canadian NIEM governance depends on NIEM domain governance, solidified in the U.S. Additional community involvement within and across NIEM domains is needed. Canadian governance is focused on exchange standards (e.g., Canadian Law Enforcement Exchange).

Canada is interested in cross-border exchange alignment for many areas (e.g., Law Enforcement, Justice, and Health). However, the alignment needs to occur at both the information (data) model and exchange model levels.

The presentation included a high level description of a proposed international justice approach using a C-LEXS extension based on the LEXS framework which uses N-DEx, and showed the relationship of the approach for the European Union (for Europol and EU-LEXS).

The Canadian vision concluded the presentation. It includes moving ahead with NIEM, leveraging already-adopted exchange models, and developing extensions only when necessitated by Canadian differences with the existing standards. (NIEM may need to adapt to encompass localization for international differences.)

Summary of Presentation by Mark Reichardt

This presentation began by defining cross-boundary, cross-domain information sharing as "the ability to access, fuse and apply diverse data sources that are critical to situational awareness." It explained that broad representation about communities (e.g., commercial, government, non-governmental organizations (NGOs), research, and university organizations) has been key to Standards Development Organization (SDO) success and also applies to NIEM adoption. Open standards are driven by community requirements. There are several reasons for open standards from the user perspective:

- Rapid adoption of new capabilities
- Reduction of system lifecycle costs
- Encouragement of market competition

- The decision to share information and services becomes a policy decision (without a technical impediment or feasibility risk)

An Open Geospatial Consortium (OGC) standard can apply to the interface between systems (e.g., between a client and a server) or can be a data-encoding standard (e.g., XML). Geospatial interoperability can be achieved through the adoption of OGC open standards. Several examples of the relevant standards were presented and discussed. The OGC standards include sensor standards which enable discovery and tasking of sensor assets. They enable access and application of sensor observations for enhanced situational awareness. GML is a standard for representing geographic features. It provides support for complex geometries, spatial and temporal reference systems, topology, units of measure, metadata, and feature and coverage visualization.

The presentation described "geospatial in NIEM" and some of the applications which have adopted it. That topic led to a discussion of the need for an approach to coordinate standards across domains (or across the "stack"). The coordination cited included OGC interaction with OASIS, the Internet Engineering Task Force (IETF), and the U.S. National Emergency Numbering Authority (NENA).

The topic of Data Sharing and Security was addressed next, including the identification of the relevant standards.

The Standards Consensus Process followed, with emphasis on the interoperability program which uses testing, prototyping, and validation before releasing a standard. The final topic described the OGC's current focus areas. It concluded with two key questions:

- How might we further improve interoperability/sharing through greater user involvement with the SDO community?
- How might we improve collaboration between SDOs on common goals of the community?

The presentation's summary made four key points (rephrased here):

- A critical underpinning for information sharing is location data
- Open geospatial and sensor standards are a comprehensive framework that have been advanced by industry to have a consistent approach to "location data"
- Prototyping and piloting are keys to successful data standards
    - The IJIS Springboard approach was mentioned as a good model
- Greater user involvement is needed in SDOs' standards development efforts

Summary of Presentation by Peter Attas

The DoD Discovery Metadata Specification (DDMS) uses and enables information sharing based on standards. Its purpose is to provide a "uniform set of metadata to promote visibility of data assets across the Department of Defense." It defines "discovery metadata elements for resources posted to the community and organizational shared spaces."

The presentation related DDMS to the DoD Net-Centric Data Strategy. It showed the timeline of the related Net-Centric guidance and mandates, including the data services environment going back to 2002 and the first DDMS version at about 2004. DDMS, its structure, extensibility, related enterprise services, and related specification were described.

That discussion introduced Universal Core (UCore) which is an XML-based information exchange. The UCore Council recently decided on two phases for the way ahead for UCore:

- Phase One: UCore – DDMS Modifications through April 2012 will include continued evolution of this standard.
- Phase Two: True convergence with NIEM by 2013. This phase will use Phase One products and continue cooperation with PM-ISE, NIEM PMO, and the IC CIO to position UCore for "convergence into NIEM framework."

The presentation concluded by identifying the DDMS next steps (quoted from slide 13):

- Changes for DDMS that reflect the needs of the UCore
- Changes to the Geographic Markup Language implementation in DDMS
- Continuing maintenance in support of the Intelligence Community's evolving requirements

Breakout Presentation by Laura Thibideaux (with edits and additions)

General Discussion

- NIEM Governance
    - About changes to communities, domains, structure, process, data model, exchanges, etc.)
- Focus on Mission Priorities and Scope
    - An obstacle to interagency and international collaboration
- Agile, flexible, malleable schemas vs. brittle infrastructure
    - Enable tailoring and extensions, while maintaining standards adherence
- Where does NIEM go next?

NIEM Governance

- Background: Need to engage stakeholders to gain consensus and context where needed.
    - Common Terms and Definitions
        - Need for clarity of communication among people and for interoperability among systems
    - International and inter-organizational collaboration
        - Expansion of the community may require further generalization and extensions, including possible tailoring / adaption during the adoption and implementation of standards
    - More effective approach when working internationally
        - Consideration of international requirements
        - Role within the community and governance
- Near Term Actions:
    - Engage stakeholders and continue to collaborate
    - Work across international boundaries
    - Innovate more agile methods to gain consensus

        - Consider testing, prototyping, piloting, and validation through live tests (demonstration), as means of gaining trust in the applicability, efficiency, and effectiveness of the standards
- Long Term Actions:
    - Evolve organizational maturity
        - Experience with developing, applying, and updating standards, based on implementation (placing into use) and operation (using and measuring the extent to which the intended results are met – interoperability: effectiveness and efficiency
    - Look across communities – agencies and countries

Focus on Mission Priorities and Scope

- **An obstacle to interagency and international collaboration**
- Background: Discussion of challenges within agencies for interagency collaboration and funding for pilots or initiatives crossing organization boundaries
- Near Term Actions:
    - Engage stakeholders and continue to collaborate
    - Work across international boundaries
- Long Term Actions:
    - Policy changes
    - Evolve organizational maturity
    - Look across communities (across domains and integration of additional domains)
        - Discover and act to resolve gaps, duplication, redundancy, and inconsistencies

Agile, flexible, malleable schemas vs. brittle infrastructure

- Background: We need to move improve our NIEM – make it easier and more flexible for the community to contribute, adopt, and participate in governance
- Near Term Actions:
    - Create and make available IEPD Templates that can be leveraged for various uses
    - Evolve and promote new technology
    - Pilot Efforts - Really "Need to engage customers and kick the tires!"
- Long Term Actions:
    - Innovate more!
        - Avoid allowing the size and complexity of the community and the standards content to slow progress in developing, adoption, implementation, and operational use

Where does NIEM go next?

- Background: How does NIEM go forward
    - Geospatial – Need greater education

        - Relates to discussion of cross-domain use and resolution of duplication, redundancy, and inconsistencies; feedback to geospatial domain to resolve gaps
    - NIEM UML
        - As an extension to the existing standards
        - As a driver for the process of developing data element and information exchange (IEPD) standards
- Near Term Actions: Continue to make progress, on the following, with increased community participation, accelerating where practical
    - NIEM 3.0
    - UCORE convergence
    - NIEM UML
- Long Term Actions:
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Additional Notes from the Discussion

Discussion Kick-off Question

- How do we include Geospatial capability in NIEM, given that NIEM is messaging agnostic?
    - Need to look at the steps required to get more geospatial savvy within other domains
    - There is an education gap, but the desire is there

Obstacles to NIEM Adoption and Use

- Claim: For legacy systems no one anywhere is funding convergence to NIEM, as its own goal, but 40 agencies have claimed to disseminate data using NIEM IEPDs
- Standards conversion is seen as having enormous cost
    - However, no one discussed the cost of continuing with the status quo of using multiple, difficult-to-maintain data conversions between multiple non-standard implementations

NIEM Governance

- Development of common terms and definitions is needed
    - Used in the NIEM context and in the description of and within NIEM UML, NIEM data elements, IEPDs, etc.
- Governance across different parts of the community or domains (international, federal, state, and local governments, with commercial and other organizations)
    - Examples: Justice-to-Justice and Health-to-Health
- Pilots should be used to engage the user (operational) communities – "kick the tires" of the proposed standards (said in the sense of "take a test drive, on enough roads, under enough weather and travel conditions, to determine the suitability")

- Pilots are used in the context of development, testing, prototyping, live test demonstrations, the systems environment, and training

NIEM 3.0 and UCore

- To what extent is UCore being integrated into NIEM 3.0?
  - Starting with country codes
  - DDMS defining discovery – metadata specification with participation from PM-ISE and NIEM PMO
  - Timeline December 2013 or sooner
  - Requirements List: Customers and Partner

Success Stories

- Leveraging NIEM requires
  - Savvy communication and education across domains and stakeholders at multiple levels – the desire to adopt data standards is there, but more coordinated, planned action is needed
  - Governance across missions: FBI, ATF, use of FBI N-DEx IEPD data payload
- Gang information exchange (related to IJIS)
  - Met with stakeholders
  - 1000+ Data Elements
- Maritime Domain Awareness (MDA) is using a collaborative effort for:
  - (Advance) Notice of Arrival – (A)NOA
  - Vessels of Interest (starting with bi-national agreement with Canada)
  - Alerts, Warnings, and Notifications (using PM-ISE) terminology
    - These terms are examples of terms which need additional definition and consensus building across the communities, to include FEMA
- OGC and OASIS work collaboratively on pilots
  - OGC is using a community of interest focus now, more than on additional data standards
- Chemical, Biological, Radiological, and Nuclear (CBRN) data interoperability
  - Need additional participation from chemical and biological risk communities
  - Part of the Global Nuclear Detection Architecture (GNDA)
  - Integrated with FEMA response and recovery
  - CBRN interchanges using NIEM are not used in Research and Development (R&D)
  - CBP has a mature process (manual activity)

Need to Improve NIEM

- Ideas proposed to understand what improvements are needed:
  - What would Steve Jobs Do to achieve market "pull" and demand for adoption?
  - Self-adaptive infrastructure – continuous improvement, as opposed to hard-to-change "hard-wired" schema
  - Need to work and cooperate internationally, elevate the scope of thinking

    - Look beyond the needs of any specific community: from "whole of government" to "whole of data standards community" perspective
    - Collaboration during standards development, using testing, prototyping, and pilots
        - Stakeholders are very focused on their own missions
        - Evolving technologies takes time, promotion, and, eventually, funding

NIEM UML

- Additional structure (or infrastructure) for NIEM, constructively mentioned as "plumbing"
- Provides a higher-level abstraction, as a basis for platform neutrality
    - Construction of names and definitions
    - Development of IEPDs and the content model
    - Description of relationships within the NIEM standard
- Also need to consider semantic web approaches and tools (e.g., RDF-OWL – Resource Description Framework-Web Ontology Language)
- Move away from dependency on the schema mechanism
    - The UML provides a higher-level context for understanding the data model
- NIEM 3.0 will look at additional representations: JSON – JavaScript Object Notation
- Can we move any faster?

DDMS Discussion

- Observations about schemas, models, and mechanisms
- Information discovery
- End users want it understandable
    - Our critical gap: lack of precision on meaning